



## Cryptodemocratic Governance in Special Economic Zones

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### Abstract

Special jurisdictions are testbeds for institutional experimentation. The newest waves propose voting mechanisms to make complex and evolving policy decisions. In this paper, we explore how blockchain technology—as a new infrastructure for voting rights—might be applied in special jurisdictions. We use the example of a ‘cryptodemocracy’, previously explored by Allen et al. (2019). In this system, voters are given property rights in votes that are recorded on decentralized blockchain ledgers. The votes can be given different bundles of property rights—such as the ability to delegate votes—that change the structure of the democratic system. Our aim in this paper is to explore the underappreciated collective choice problems underpinning special jurisdictions, outline the potential for cryptodemocratic voting systems as new infrastructure for special jurisdictions, and propose directions for future research.

**Keywords:** Special Economic Zones, Blockchain Technology, Robust Political Economy, Cryptodemocracy, Blockchain Voting

### Resumen

Las jurisdicciones especiales son lugares que facilitan la experimentación institucional. Las nuevas olas proponen mecanismos de votación para tomar decisiones políticas complejas y cambiantes. En este documento, exploramos cómo la tecnología blockchain, como una nueva

infraestructura para los derechos de voto, podría aplicarse en jurisdicciones especiales. Utilizamos el ejemplo de la previamente explorada por Allen et al. (2019). En este sistema, a los votantes se les otorgan derechos de propiedad en los votos que se registran en los libros de contabilidad descentralizados de blockchain. Los votos pueden recibir diferentes paquetes de derechos de propiedad, como la capacidad de delegar votos, que cambian la estructura del sistema democrático. En este artículo, nuestro objetivo es explorar algunos los problemas de elección colectiva presentes que sustentan jurisdicciones especiales y describir el potencial de los sistemas de votación criptodemocráticos como una nueva infraestructura para jurisdicciones especiales. También proponemos direcciones para futuras investigaciones.

**Palabras clave:** criptodemocracia, Zonas Económicas Especiales, tecnologías blockchain, Economía política robusta, votación por medio de blockchain.

## 1. INTRODUCTION

Special Economic Zones (SEZs) are a class of special jurisdiction where geographic areas have different rules—such as lower taxes or fewer regulations—compared to host jurisdictions (e.g. see Akinci et al., 2008; Bell, 2017). New special jurisdictions represent a devolution and decentralization of political power, spurring diverse governance structures that differ widely in terms of their policies, size, funding and governance. Special jurisdictions have historically generated political, social and economic liberalization.

There is a long history of research examining SEZs, much of which examines their economic performance compared to host jurisdictions (see Devereux and Chen, 1995; Fenwick, 1984; Liang, 1999; Wang, 2013; Yeung et al., 2009). Special jurisdictions provide a comparatively effective environment for experimentations in new forms of governance, including democratic governance. In this paper, we contribute to the understanding of special jurisdictions by exploring the potential for blockchain-enabled voting infrastructure to facilitate some collective choice

problems in special jurisdictions. Our analysis might help to address some of the collective choice frictions in special jurisdictions, namely transparency, accountability and corruption of governments and private governing bodies.

An underappreciated problem for special jurisdictions is the need to make choices in groups. Special jurisdictions require collective choices to be made under uncertainty, over a wide range of policy alternatives, and with fuzzy stakeholder groups. Some of those choices are in the initial establishment and founding of a zone, such as where a zone is located. In that stage, important decisions include the policy margins of a zone and how it differs from the host jurisdiction. In later stages, as the special jurisdiction develops and evolves, new questions arise, and they might include reflections upon initial policies that were not fit for purpose and must be changed. In Special Economic Zones, these choices are exacerbated by often high levels of migration and policy uncertainty, as well as a complex and competing mix of private and public stakeholders. As we shall argue, these governance challenges present an

opportunity for alternative democratic structures enabled by new technologies.

In this paper, we explore the potential for cryptodemocratic governance to ameliorate challenges in designing and governing special jurisdictions. A ‘cryptodemocracy’ is a blockchain-enabled collective choice infrastructure on which individuals coordinate their voting property rights on a decentralized platform. What blockchain technology enables, we argue, are more emergent, dynamic and responsive forms of democratic governance—that is, collective choice infrastructure that better overcomes knowledge and incentive problems. These are precisely the challenges we have identified that a cryptodemocracy could address in the governance of special jurisdictions.

Cryptodemocracies could potentially overcome some collective choice problems faced in special zones today, and further problems that arise as more special zones are developed. There are several further reasons why examining cryptodemocratic governance in SEZs is fruitful. First, special jurisdictions have a comparative advantage in testing policy ideas than larger jurisdictions—they are

highly experimental testbeds. Applying cryptodemocracies in special jurisdictions could extend experimentation within special jurisdictions beyond policy questions (such as lower taxes or fewer regulations) and into political structures themselves (such as new institutional possibilities of democratic decision making).

Second, the opportunity for experimentation extends beyond the borders of the special jurisdiction within which cryptodemocracy could be trialed. Some policies from special jurisdictions have spread to host jurisdictions, sparking “liberalization avalanches” far beyond initial comprehension (Moberg and Tarko, 2014). China’s experience demonstrates the way that this contagion effect can occur (e.g. see Crane, 1990, 1994; Montinola et al., 1995). Shenzhen, the first special zone in China, was implemented in 1980. The lessons were quickly expanded across other areas of the country (see Yeung et al., 2009). Even further, cryptodemocracies might first be applied in special jurisdictions before being exported to other jurisdictions. In this way, cryptodemocratic governance of special jurisdictions might not only facilitate zone

governance, but provide insights into innovative governance for existing jurisdictions seeking to reform their democratic structures.

This paper proceeds in the following way. In the second section, we introduce special jurisdictions and make a case for collective choice infrastructure to discover new policies (knowledge problems) and to incentivize good governance (incentive problems). In the third section, we introduce the challenges of designing systems for collective choice, including a range of proposals to improve the functioning of democracy. In the fourth section, we define and introduce cryptodemocracies, including their theoretical properties. In the fifth section, we consider how cryptodemocracy might be applied in special jurisdictions and deployed to facilitate zone governance. In the sixth section, we conclude by discussing directions for future research.

## **2. BLOCKCHAINS AND DISTRIBUTED VOTING SYSTEMS**

Blockchain is a decentralized and immutable digital database that is made possible through the combination of several technologies, including asymmetric

cryptography, cryptographic hash functions, peer-to-peer networking, consensus algorithms, and game theoretic incentive design (Berg et al., 2019). Blockchain was initially invented to support a trusted digital currency that did not require a centralized financial intermediary (Nakamoto, 2008). The applications of blockchain, however, extend well beyond finance and cryptocurrencies into areas such as enabling transparency in global supply chains and logistics (e.g. see IBM, 2018).

More broadly, blockchains are decentralized and distributed ledgers where a network of computers maintain consensus over shared data—and can undertake shared computations—using economic incentives. Blockchains can be considered a new type of decentralized infrastructure (see Allen, Berg, Novak, Markey-Towler and Potts, forthcoming; Berg, Davidson and Potts, 2019; Davidson, De Filippi and Potts, 2018; Werbach, 2018). Blockchain protocols are now being developed with a range of different cost, speed, privacy and security characteristics. Where blockchains provide trust more effectively than firms or governments, we should expect some exchanges and

activities previously maintained by centralized ledgers to shift towards decentralized blockchain networks (see Davidson et al., 2018). Indeed, blockchains are now being applied in diverse areas that are relevant and of particular interest to the success of and investment in special jurisdictions, including supply chains, charity donation tracking and property registries. Our focus is on blockchain's application to solve problems related to voting.

A cryptodemocracy is a new type of collective choice infrastructure that uses blockchain technology for coordinating voting property rights (see Allen et al., 2019; Allen, Berg, Lane, et al., 2018). Rather than votes being recorded centrally by governments and organizations, blockchain enables votes to be recorded in a decentralized and distributed way. Blockchain has the potential to overcome some of the challenges of traditional democratic governance, including transparency and voter fraud. Moreover, this infrastructure opens the possibility for voters to trade, decompose and delegate their voting rights to others, creating an entirely emergent

democratic structure. This is an idea we explore in subsequent sections.

Cryptodemocracies could facilitate proposals for innovations in democratic governance, such as quadratic voting. This can be enabled by embedding rules into the protocol, constraining voting rights in different ways. Therefore a cryptodemocracy should be understood as the general infrastructure in which democratic structures can be designed and built. The new institutional structures that blockchains enable include more dynamic and non-territorial decision-making systems. These new democratic systems might integrate more voter knowledge (e.g. about potential policy choices) into collective choices and could potentially make democracies more accountable and responsive.

### **3. WHAT MAKES SPECIAL JURISDICTIONS ROBUST**

Special jurisdictions exist amongst the messy and complex reality of a political-economy system. Here we use the robust political economy framework to help understand the governance problems of special jurisdictions (Boettke and Leeson, 2004; Leeson and Subrick, 2006;

Pennington, 2011). Institutional governance systems are more robust if they deal comparatively well with knowledge problems (discovering effective policies) and incentive problems (preventing opportunistic behavior). Moberg (2015, p. 169) has applied this framework to special jurisdictions to argue that “decision makers need both be able to find the proper policies for the zones and have the incentive to implement them.”

Special jurisdictions face certain knowledge problems. Knowledge problems arise because information is distributed about an economy in the minds of individuals and individual preferences are not given but must be discovered (Hayek, 1945; Boettke, 2018). In special jurisdictions, decisions about the ‘rules of the game’ themselves must be made. They need institutions to make collective decisions such as the breadth and extent of reform in the zone. In the most extreme cases, these decisions include the structure of the political system and how the jurisdiction will maintain governance autonomy. Policies within special jurisdictions also need to change dynamically. While a special jurisdiction might begin with simple reductions in

tariffs, it might later decide to implement reforms to immigration restrictions to attract workers. Addressing these choices underscores the need for collective choice infrastructure in special jurisdictions. The more effective that infrastructure is at coordinating knowledge, the better it will solve knowledge problems and make the jurisdiction more robust through time.

The institutional frameworks in special jurisdictions must also deal with incentive problems. Political elites and powerful companies can and do act in self-interested ways that may lead them away from providing effective governance. People governing zones have to be held accountable for their actions, incentivized to provide good governance. This raises the question of how we can implement institutions that encourage what Acemoglu and Robinson (2012) call inclusive institutions (those institutions that encourage peaceful cooperation and exchanges) rather than “extractive” institutions. There are two main ways to ameliorate the incentive problem in special jurisdictions: privatization and democratic accountability (Lutter, 2017; Moberg, 2015).

Privatization can help align the incentives of investors, administrators and citizens by giving the zone's governing body a stake in the outcome of those decisions (such as whether those choices generate growth). Lutter engages with privatization through the concept of 'proprietary cities'. They have three main characteristics: The land owner is a private for-profit entity; they have a high degree of legal and regulatory autonomy; and the entity has a "meaningful role in creating and enforcing the legal system" (Lutter, 2017, p. 2). Such an arrangement could enable experimentation and discovery of new institutional systems, partly because, in some ways, they could be seen as beginning from blank slates rather than approaching reform at the margin.

While autonomy and privatization can help align incentives and encourage innovation, it can also create other incentive problems. The role of the host government in a proprietary city at the most basic level is to provide a separate company (or a group of companies) with the autonomy to govern over a territory. This, however, creates complicated incentive relationships between private investors, citizens and governments.

Private autonomous governance could ameliorate both knowledge problems through decentralized institutional entrepreneurship. As for incentive problems, it could address them through more accountability and preventing the encroachment of external interests.

Democratic accountability in zones also helps solve incentive problems by making those who govern accountable for their decisions by those subject to them (Moberg, 2015). Moberg argues that corporate and political elites gain from making good policy choices by maintaining political power. Coupled with this is the notion of decentralization of governance that gives local officials the incentive to make good choices and contribute to solving the knowledge problem (Moberg, 2015). That is, by tying governance choices to outcomes, we can suppress opportunistic behavior by officials. This notion of decentralization and devolution of power, and the additional accountability that comes with it, also creates external political and governance challenges. Special jurisdictions must maintain relationships with host governments, where incentives between host governments and special jurisdictions may



not be aligned (e.g. the host jurisdiction may seek to extract rents or favor their private interests).

One example of this tension with governments, as Bell (2017) charts in a case study in his recent book, is the tumultuous history of special zones in Honduras. In 2011, the Honduran Congress (almost unanimously) voted in favor of constitutional amendment to enable a new form of special zones. These zones were to be extensive including more autonomous commercial laws, public administration, courts and policy—including the power to set their own tax regulations. Then, in 2012, the Supreme Court struck down the proposal on the basis that it was unconstitutional. Later, in 2013, Honduras passed legislation that enabled another type of special zone called a ‘ZEDE’ (Zonas de empleo y desarrollo económico).

The ZEDE attempts to overcome some of the incentive problems between special and host jurisdictions through institutional design. For instance, in Honduras, each ZEDE is required to transfer 12 per cent of tax revenues back to the central government. This arrangement allows it to remit money back

to the central government but remain the residual claimant on profits.

In this section we have outlined the knowledge and coordination problems that special jurisdictions face. Solving those problems requires collective choice (voting) infrastructure. We have argued that special jurisdictions have unique governance problems, such as the relation to a host government and their need for balancing this with attracting investment.

#### **4. THE COLLECTIVE CHOICE PROBLEM**

To understand innovations in democratic governance we must first understand the nature of collective choice. We structure democracies to make group decisions. Coordinating decisions in small homogenous groups is easy. With more participants, and with diverse preferences, group decisions become hard—there are substantial transaction costs in integrating preferences into decisions about what governments should, should not, can and cannot do. One common way to overcome the costs of this group decision-making problem is through the mechanisms of representative democracy. We elect political representatives in defined

geographical areas (i.e. electorates) through a one-person-one-vote election process, and then those representatives vote on our behalf. These representatives might also be organized into multiple houses of parliament or congress, creating a supermajority (where in effect more than 51% of votes are required to change rules). Power is then delegated to other statutory bodies to enforce and administer that legislation. In this way, representative democracies both attempt to enable people to take part in decisions, while also delegating day-to-day powers away from the entire franchise. From this perspective, democratic mechanisms are complicated and intricate processes for collective decisions in a world of positive transaction costs (i.e. the various costs of coming to collective decisions under uncertainty).

There have been several recent scholarly efforts to propose new institutions to improve collective governance processes. Let us briefly examine three such proposals: Quadratic Voting (QV), Epistocracy, and Futarchy. These examples of innovative new forms of governance provide insights into the potential scope of cryptodemocratic innovation for special jurisdictions. It is

important to note that these are not necessarily alternatives to cryptodemocratic governance, as a cryptodemocracy does not presuppose the structure of any democratic system. Instead, it is infrastructure for coordinating voting rights. Each of the three following proposals could be implemented as rules constraining voting rights.

First, Quadratic Voting (QV) is a rule where voters may purchase additional voting rights for a price that is a square of the number of votes purchased (Posner and Weyl 2015). After the vote, the money collected is redistributed to the voters on a per capita basis (Posner and Weyl 2015). QV attempts to avoid the tyranny of an apathetic majority associated with the traditional ‘one person, one vote’ rule where the democratic outcome may not reflect the intensity of preferences of the collective group. Under QV, the number of votes cast is not fixed, however the quadratic nature of the voting rule means that “it becomes prohibitively expensive for a small group of wealthy individuals to affect the outcome” (Allen et al, 2019, p. 80). QV could be implemented using blockchain (Allen, Berg, Lane et al, 2018)

or as a governance infrastructure to support blockchain communities more generally (Buterin et al. 2018).

Second, Epistocracy or the ‘rule of the knowledgeable’ is a proposal to weight voting rights according to a voter’s knowledge and intelligence (Brennan 2016). This proposal seeks to ameliorate perceived problems with ‘one person, one vote’ rule where the aggregation of preferences is not efficient because voters may be biased, misinformed, or ignorant of the policies and candidates that they are voting for. A practical application of this using blockchain infrastructure is the political movement ‘Flux’, where voters can choose to delegate voting rights to trusted experts (vote<sup>flux</sup>.org). In the Flux model, individuals are encouraged to vote particular candidates into parliament, and then a form of Issues Based Direct Democracy is implemented, enabling people to vote more directly on issues that come before parliament.

Third, Futarchy seeks to harness speculative betting markets as an alternative mechanism for aggregating knowledge about which policies should be implemented. Under this system, voters would decide the political goals while

betting markets would determine the specific actions that the elected government would implement and administer. The basic rule of Futarchy is that “when speculative markets clearly estimate that a proposed policy would increase national welfare, that policy becomes law” (Hanson 2013, p. 152). There has been speculation that this system could be used for the governance of Decentralized Autonomous Organizations (Buterin 2014; Merkle 2016), which are new types of organizations run on blockchain-based networks and governed through various decentralized voting mechanisms.

Each of these proposals seeks to create a new arrangement of voting property rights. This raises the questions about the purpose of democratic voting, and how we can judge the effectiveness of a democratic system? According to Hayek (1960), the benefits of democracy come through its dynamic process and the formation of opinion. Indeed, as Hayek (1960, p. 94) notes, the “... chief advantage [of democracy] lies not in its method of selecting those who govern but in the fact that, because a great part of the population takes an active part in the formation of

opinion, a correspondingly wide range of persons is available from which to select.”

The way we structure democratic institutions has changed through time and is affected by technological change. New technologies change how we deal with transaction costs and enable us to organize ourselves in new ways. Over millennia, technologies have created new possibilities by changing the way we record and organize votes. History demonstrates new technologies do not just lower the costs of existing collective choice institutions, they fundamentally change the shape and functioning of those infrastructures.

Communications technologies, including writing, enabled us to lodge and record votes. Some technologies, such as the Kleroterion in Athenian polls, were specifically invented to reduce opportunism by ensuring the process of random sortition was not compromised. The printing press enabled us to use printed ballot papers and facilitated representative democracy over greater distances. The internet has not only facilitated complementary parts of democratic governance, such as the free press, to a certain extent, but also promises more direct democracy by

lowering the costs of frequent online voting. That is, technologies facilitate our ability to vote more often by lowering the costs of casting votes into a collective decision. Democracies do not only get faster and cheaper when we invent new technologies. Technologies make new democratic mechanisms possible.

Indeed, democratic structures solve knowledge and incentive problems in different ways. On one hand, direct democracies integrate more dispersed knowledge through more frequent voting and therefore might ameliorate some knowledge problems. On the other hand, representative democracies (where we vote less frequently) put decision making power in representatives, but open the potential for agency and incentive problems.

We can think of votes as a bundle of rights—that gives one the capacity to do some things but not others with that property—that enable you to take part in a collective decision, to fulfil some democratic purpose. In modern elections, voting rights are tightly regulated and planned. Votes are evenly distributed across the adult population. Your vote must be cast at set times (perhaps every

three to five years). You can only vote for the candidates in your geographical area in which you are registered. Your vote must also be made in secrecy at a polling booth (in the sense your vote cannot be externally verified). You cannot withdraw your vote once it is cast (wait three more years). You cannot vote directly on some issues, but delegate other decisions to representatives. Further, exercising your individual voting right is contingent on the pattern of other people exercising their voting rights. Some nations with compulsory voting, such as Australia, even compel you to exercise your right (or risk being fined).

Voting rights look the way they do for many reasons, but generally they exist to create some democratic political process. Those political systems variously seek to coordinate and aggregate information, or prevent the tyranny of the majority, or to make governments legitimate or accountable. Voting rights can change over time in relation to some desirable democratic processes, justified through greater efficiency of collective decision making. For instance, restrictions on your right to sell your vote are connected back to the potential of

individuals imposing externalities on others, and the mapping on economic inequality onto political inequality (more on this later). It is in this context that blockchain demonstrates the potential to secure votes, opening the potential for more voting rights and new democratic structures. We refer to this underlying collective choice infrastructure that blockchain facilitates as cryptodemocratic governance.

## **5. WHAT IS A CRYPTODEMOCRACY?**

New technologies open new institutional possibilities, including novel ways to organize collective decision making, that were previously unfeasible. We now turn to the opportunities that blockchain technology presents as collective choice infrastructure. Earlier we defined a cryptodemocracy as a blockchain-enabled collective choice infrastructure on which individuals coordinate their voting property rights on a decentralized platform. A cryptodemocracy is a technological infrastructure that facilitates the recording and contracting of votes between parties. Together, blockchains and smart contracts enable votes to become programmable and contractible.

Given the complexity of such a voting system—with many layers and unbundling—a decentralized blockchain infrastructure for securely and transparently recording voting property rights is critical.

A cryptodemocracy has distinct properties that may help ameliorate some of the collective choice problems identified in the previous section. In this section, we explore some of those properties before turning to the specific application of cryptodemocracy to special jurisdictions.

Blockchain has been proposed as a new digital infrastructure for democratic decision-making to give voters more wide-ranging voting rights, radically reshaping how democracies work (e.g. see Van Rijmenam and Ryan 2019; Allen et al., 2019). This is because democratic governance requires mechanisms for recording an entitlement to vote and managing where or how votes can be executed. Historically, these records have been centrally maintained by a trusted intermediary (such as an electoral commission for the conduct of public elections). There are well-known problems and controversies surrounding the integrity of centralized voting

systems—such as the potential for bribery and corruption of central electoral authorities, ballot stuffing, vote-rigging, misplaced or destroyed votes, inaccurate and unauthenticated voter identification. There are similar problems with attempts in digitizing those systems (see Allen, Berg, Lane, et al., 2018).

Blockchain applied to democratic voting attempts to overcome issues of erroneous recording of voters and votes that comes from having a centralized voting process administered by a government entity. For instance, rather than a centralized recording of votes, it is possible that each voter could be given a cryptographically-secure token, recorded on a decentralized ledger, which represents their vote.

There are many reasons why distributed and decentralized blockchain ledgers may be effective for the problem of recording votes. For instance, “compared to standard centralised voting systems (where there is a single authority monitoring actions), a blockchain-based voting system can allow some level of decentralisation on the monitoring and implementation of the system’s procedures” (Dhillon et al 2019, p. 6).

Bogucki (2017) also outlines several benefits of blockchain for the voting process including the robustness of a distributed system in the case of a server being compromised, and the potential protection of voter identities. One of the obvious benefits of such an infrastructure is that this ledger is publicly auditable, thus providing transparency over the conduct of the voting process. Blockchain was originally introduced to solve the ‘double spending problem’ for digital currencies, but it may also solve the ‘double voting problem’. A blockchain-enabled cryptodemocracy can ensure integrity in collective choice processes not only for public government elections, but also for private companies. This is pertinent for special jurisdictions, which are increasingly operated by private companies.

But cryptodemocracy would not simply be an application of blockchain to voting where the same democratic structures (e.g. representative democracy) are maintained. The concept of cryptodemocracy does not necessarily presuppose any specific constitutional rules about the allocation of those voting property rights (e.g. the franchise) or the

specific rules regarding the exercise of voting property rights (e.g. voting districts, election cycles). Instead, a variety of different structures could emerge. And this, we argue, has far more radical implications:

Allen et al. (2019) explain that a cryptodemocracy could draw on the decentralization and cryptographic security of blockchain to establish and govern a system of property rights over votes. Once property rights over votes are allocated and enforceable, individuals would be able to contract, exchange, and utilize their votes in a decentralized and evolutionary system. In that way, cryptodemocracy would provide for a democratic, polycentric and spontaneously ordered system of collective choice that has not yet been possible under the existing institutional and technological framework.

Compared to more familiar democratic structures, a cryptodemocracy theoretically exhibits some unique and desirable characteristics. By giving people cryptodemocratic voting rights, more local tacit knowledge can enter collective choices. Indeed, democratic processes are not a process of aggregating preferences to

some objectively correct outcome, but rather a messy process of knowledge coordination and learning over subjective policy problems.

Cryptodemocratic governance can be applied to solve some of the governance problems underpinning special jurisdictions. There is potential here for both public elections (e.g. electing governments or administrative bodies) as well as within and between private and not-for-profit organizations (e.g. corporate shareholder voting or union governance). These opportunities could ameliorate some of the knowledge problems of special zones (such as what policy changes should be made) by incentivizing the revelation of preferences and by making decision making more dynamic. Cryptodemocratic governance may also create new incentive structures, bringing about more responsive and accountable governance.

In current democratic systems, one reason why voting property rights are restricted (e.g. not being able to transfer votes) is because those voting rights could not be securely or reliably executed. Given that blockchains enable us to execute particular voting rights (e.g. delegations)

more securely, this allows new forms of democratic governance to emerge, with the potential to reshape democratic institutions. In contrast, blockchain technology, together with smart contracting technology, enables a much more extensive set of rights to be attached to votes, opening new structures of collective decision making. As we saw above, people have long proposed and discussed new democratic structures, contrasting them with our current rigid systems. These systems are partly rigid because we did not have the technology to overcome the transaction and political costs of more fluid and dynamic political group decisions. However, blockchain, we argue, might bring those democratic structures into the realms of possibility through cryptodemocratic governance.

While the decision of what voting rights would be enabled in a cryptodemocracy is a constitutional decision written into the voting protocol—for instance, whether votes could be bought and sold, or some maximum amount of votes a single voter could acquire—it is worth exploring what some of those rights might be. Voters could be free to delegate (i.e. contract) to



any other individual voter within the franchise, or even outside the franchise (rather than just their geographical representatives). Voters might be able to place conditions on those delegation contracts, such as time limits after which the voting right would return to the original holder. Voters might decide to retain their right to vote on certain issues (e.g. social issues) while delegating portions of their voting rights to others (e.g. economic issues). This unbundling of votes is, of course, limited by the extent to which such unbundling could be coded. Even further, voters might be able to buy and sell votes (integrating compensation into the voting contracts). But it is not clear which way this money would flow: would voters sell their voting rights, or would they delegate their rights and pay delegates to act on their behalf? This final proposition—vote buying and selling—is controversial and worth further exposition.

A long history of stigma sits around voting markets. But there are several arguments for developing markets for votes. In ‘one person, one-vote’ systems with restrictions on voting rights, voters are unable to express their intensity of

preference. It does not matter the extent someone cares about an issue; everyone gets to cast one vote. This means a reasonably indifferent majority can overpower a minority who cares very strongly about an issue.

In product markets, this is solved by enabling trade. Indeed, there are gains from trade between two blocks of voters, one of which can compensate the other for their voting rights. The core (utilitarian) argument for voting markets, aside from arguments about fundamental freedoms of vote alienability, is that markets process information and integrate more preferences and distributed knowledge into a collective choice.

Arguing for vote buying is often quickly followed by vehement disagreement along three main directions (Allen et al., 2019). The first problem, or concern, with voting markets is inequality. In this view, the rich would buy all the voting rights from poor populations. While there is reason to be fearful of economic inequality mapping onto political equality, one of the challenges with this objection is the reality that politics and money are already intertwined—but that money gets captured by the political elites through

lobbying and funding. Logrolling processes also look very much like voting markets—except the transfers are between the representatives.

Another common argument for restricting vote buying and selling is inefficiency. In this argument, there is a distinct difference between voting markets and other markets. In product markets each voluntary exchange can be mutually beneficial, and this might not impose externalities on others. In voting markets, while each exchange can be beneficial, the overall collective decision is imposed on everyone. That is, voting markets are bad and inefficient because they impose externalities.

However, democracies inherently impose externalities through group decision and enforcement. Indeed, as Brennan (2016, p. 9) describes, there are fundamental differences in how democracies govern and individuals make other choices:

An electorate is not like an individual. It is a collection of individuals with separate goals, behaviors and intellectual credentials. It is not a unified body in

which every person advocates the same policies. Instead, some people impose their decisions on others... Political decision making is not choosing for oneself it is choosing for everyone. If the majority makes a capricious decision, others have to suffer the risks.

Coase (1960) taught us that, with sufficiently low transaction costs, property rights will be bargained through contracts towards their more efficient use. Some have attempted to extend this understanding into the political sphere. In the political sphere, by giving people property rights in votes and then opening voting markets, externalities could be internalized. This is the “Political Coase Theorem” (PCT). But there are several arguments against PCT. For instance, Acemoglu points out commitment problems in the PCT, arguing the system is based on the idea of credible commitments and enforceable contracts, and that these cannot exist within politics (e.g. Acemoglu, 2003). However, as we will see further below “blockchain might facilitate a Coasian bargaining process—that is, the process of bargaining may tend property rights to their most valued use—by

lowering agency costs of enforceability” (Allen et al., 2019, p. 78).

The third argument against voting markets is that votes are anti-commodifiable. In this view, the votes belong to the community, not individual people, and serve a public purpose for group decision making. Therefore, they should not be sold. When a cryptodemocracy is established, one of the decisions that must be made is the extent of rights that will attach to each vote. For instance, are voters able to buy and sell votes? Is there a maximum number of votes that any one delegate could hold? This decision can be considered a form of “constitutional” choice that is coded into the blockchain protocol. There are many ways that voting rights might be restricted. For instance, votes could be bought and sold but there may be some restrictions attached, such as quadratic voting mechanisms that make it prohibitively costly to buy many votes (Posner and Weyl, 2015).

While the exact scope and application of what we here refer to as cryptodemocracy could be discovered over time, we can explore some of the features of cryptodemocratic governance

compared to features of more conventional governance structures. Some of these properties, we claim, could make cryptodemocracies more interesting than democratic systems which are more limited, inasmuch they do not offer possibilities such as vote delegation. Cryptodemocracies could have emergent structures and multiple centers of decision making. That is, they would be polycentric. Cryptodemocracies are hard to define because their structures could be seen as a “catallaxy” (a spontaneously emergent order) rather than a “taxis” (a consciously planned order) (Hayek, 1973), whereby the constellation of voting property rights at any given time is a function of voter preferences.

Cryptodemocracies could also be more knowledge-rich than conventional democratic structures. This is because the process of delegation and coordination between voters and delegates could potentially integrate more local and contextual knowledge into collective choices. Some of that knowledge might come from the buying and selling of voting rights. This process can enable people to demonstrate their preferences clearly. Other knowledge will come through the

process of delegation, where individual votes have more power to self-identify how and in what way they wish to take part in the political process. It is worth reexamining here some of the claims of voter ignorance and irrationality as described previously. In a cryptodemocracy voters—by having property rights within their own vote—will not homogeneously have the right to exercise their vote within predetermined constraints. Rather than some homogenous “bundle” of voter property rights being defined, individuals can more fully determine how they wish to engage.

## **6. CRYPTODEMOCRATIC GOVERNANCE FOR SPECIAL ECONOMIC ZONES**

No one knows exactly what cryptodemocracies will look like and at what scales they will be applied. For instance, cryptodemocracies might be applied across both the private sector (e.g. corporate governance) and the public sector (e.g. regional governance) to solve different governance problems. There will likely not be “a” cryptodemocracy, but several forms of them. At various levels, over the coming decades we are likely to

see extended experimentation with cryptodemocratic governance infrastructure. These applications will implement different types of democratic systems with variances in the bundles of voting property rights given to voters. Where could we expect the first application of cryptodemocratic governance is in the private sector. The private sector has fewer barriers to application and adoption of new technologies. While over time we might see these innovative forms of governance in public elections, or within the operation of political parties themselves, special jurisdictions are particularly well-placed for governance experiments. As we saw in previously, special jurisdictions have a range of overlapping and ongoing collective choice governance problems. Those governance problems include issues of incentivizing effective governance, relationships to host governments, and policy change. However, the autonomous and greenfield nature of special jurisdictions also suggests they are comparatively well-placed for experiments in innovative governance. It's highly unlikely that a new cryptodemocratic governance system would be implemented within a major established country in the

near future because of entrenched political interests and risk aversion. By contrast, the formation of new special economic zones can be a greenfield for new collective choice governance infrastructure. Special jurisdictions are forms of innovative governance for new policies to be implemented and tested compared to host jurisdictions. When new special jurisdictions are developed, they also come with the creation of new governance. This presents an opportunity for testing new cryptodemocratic governance structures. To be sure, cryptodemocracies are not a silver bullet for the governance challenges of special jurisdictions, but they provide a promising and complementary possibility for experimentation in a unique environment that requires new institutional infrastructure.

Cryptodemocratic governance structures could be implemented in the public and administrative processes of new zones. That is, cryptodemocracies could be used as a mechanism to create new parliamentary structures, or to enable forms of direct democracy where voters vote more regularly on issues. This might make those governance structures more

responsive and accountable to voters and to investors. The features of a cryptodemocracy, including its ability to integrate more voter preferences into collective decision, could also be useful with issues facing special jurisdictions. For instance, special jurisdictions might have a rapid increase in population numbers due to migration. This increase in population not only increases the size of those who may be eligible to vote (i.e. the franchise), but also changes the preferences and structure of that voter base. These migration dynamics further underscore the need for effective collective choice infrastructure, such as cryptodemocratic governance.

Special jurisdictions have a wide range of challenges regarding knowledge coordination and discovery. The epistemic features of cryptodemocratic governance, such as the delegation and unbundling of rights, might enable more knowledge to be integrated into those political decisions. Competition between jurisdictions leads to better governance as policymakers are incentivized to provide policies that better reflect its population's preferences in decision making, given the relatively free movement of people and flow of capital.

Indeed, information is generated through the process of competition itself as institutional level experimentation occurs (see Vanberg and Kerber 1994). Cryptodemocracies might therefore provide collective choice infrastructure for better public governance *within* special jurisdictions, further increasing the capacity of jurisdictional competition.

The applications of cryptodemocracies extend into the private sector too. As we have seen, there are an increasing number of zones that are privately funded and operated. One clear application of cryptodemocratic governance is for corporate shareholder voting. A company's shareholders vote on a range of important company decisions including director elections, merger deals, winding up, and constitutional changes. Shareholders are already contracting and delegating voting rights in this corporate context. However, problems with identifying and tracing votes has undermined integrity in corporate voting (see Kahan and Rock, 2007). Blockchain-enabled share registries promise to address these problems (see Geis, 2018). Cryptodemocratic governance might therefore strengthen corporate

voting processes and provide greater scope for shareholder decision making (see Allen et al., 2019). This might further facilitate the development of privately funded and operated special economic zones.

Moreover, special jurisdictions could adopt Distributed Autonomous Organizations (DAOs) that draw on the local knowledge of citizens (or some other voter or investor group) to make decisions around funding of future infrastructure projects—as well as innovative ways to fund public goods such as dominant assurance contracts (on dominant assurance contracts see Tabarrok, 1998).

Cryptodemocratic governance could also help special jurisdictions scale. There are various benefits of people living together in cities, including the benefits of mutually beneficial trade, and the way that innovation diffuses between organizations (i.e. innovation spillovers). To effectively leverage these dynamics, special zones might aim to incorporate large groups of people. At the same time, however, one of the benefits of special jurisdictions, by their definition, is providing smaller scale innovations in governance that can be tested and can compete with other

jurisdictions. That discovery process might better occur at a lower, more disaggregated level to draw from local knowledge, and to test and trial new policies while maintaining close proximity in physical space.

Institutional entrepreneurs can create private governance structures (where they are the residual claimants on those rules) to facilitate contracting. Competing private governance structures can bring the benefits of innovation and competition to rule systems. Blockchain provides a new technology for private entrepreneurs—who have the incentive for their institutions to succeed—to spin up competing institutional governance structures to facilitate voluntary exchange (Allen, forthcoming). Cryptodemocratic governance, we argue, is a new mechanism for robust special jurisdictions that relies on the emergence and discovery of new institutions by sovereign institutional entrepreneurs (see Salter 2018).

## **7. CONCLUSION AND FUTURE RESEARCH DIRECTIONS**

Special Economic Zones (SEZs) have mixes of public and private collective choices. Some governance problems are at

the public level, such as what taxation policies should be changed, or what physical infrastructure should be built. Other choices are in the private sector, such as shareholder voting and labor union governance. Collective choice problems might be exacerbated given levels of policy and regulatory uncertainty, competing and sometimes unclear groups of stakeholders, and rapid migration and movement across jurisdictions.

Since ancient times, societies have invented and applied technologies to facilitate collective choice. One recent advance in technologies of collective choice is blockchain. Blockchain technology is a class of distributed ledger technology—an institutional technology—that has potential application in collective choice infrastructure by creating cryptodemocracies. To be sure, technical problems remain over blockchains themselves. One major challenge relating to cryptodemocratic governance is the implementation of voter identities. There are, however, substantial innovation resources directed at solving problems such as identity.

Cryptodemocracies involve individuals being given voting property

rights that they can delegate to others using smart contracts. Just as the printing press enabled the modern secret ballot, blockchain can facilitate new institutional possibilities of democratic governance, perhaps with radically different shapes.

Our contribution in this paper is combining an understanding of the challenges in special jurisdictions with blockchain as a new, frontier digital collective choice infrastructure. Existing research on special jurisdictions has comparatively analyzed and measured the impact of special zones (and their policies) on economic and social development. Our focus on cryptodemocratic governance suggests a new area of comparative analysis over the collective choice mechanisms of forming and developing those different institutions. Better collective choice infrastructure enhances the capacity for the devolution of political power to smaller jurisdictions, potentially spurring greater jurisdictional competition. While we have focused on the potential impact of cryptodemocratic governance—to solve collective choice voting problems—it is worthwhile noting that these applications are just one example of the potential for blockchain

technology in special jurisdictions. Blockchain is an institutional technology and can be used to provide trust in shared data, including in supply chains, tracking donations and investments, and charities. In this way blockchain can be more broadly understood as a tool to facilitate experimentation in institutional infrastructure, which can help to expand investment in special jurisdictions along multiple margins, including through the reduction in corruption (see Moberg, 2015).

Our analysis of the knowledge and incentive problems of special zones opens a new scope of research questions. There are at least two main directions for future research. First, theoretical analysis of cryptodemocratic governance, as specifically applied to challenges in special jurisdictions, might go further to incorporate computational simulations of the operation of cryptodemocratic infrastructure—including some of its characteristics, such as stability—and laboratory experiments to investigate how people act with a wider range of voting rights at their disposal. Second, if cryptodemocracies are developed within a special jurisdiction context there, will be



empirical data to analyse. Once new digital collective choice  
cryptodemocracies are applied in practice, infrastructure.  
we expect a range of potential case studies  
to shed light on some of the more specific  
challenges and opportunities of developing

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